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9
EXAMINER

HASSANZADEH, PARVIZ

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/020,413

Applicant(s)

DHINDSA ET AL.

Examiner

Parviz Hassanzadeh

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 13-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7,8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, drawn to an apparatus, classified in class 118, subclass 723R.
- II. Claims 13-17, drawn to a method of assembling a showerhead electrode, classified in class 427, subclass 569.
- III. Claims 18-22, drawn to a method of processing a substrate, classified in class 438, subclass 710.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Groups II, III are related as process and apparatus for its practice.

The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus does not require a showerhead electrode and thus the methods can be practiced by another materially different apparatus.

Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions the method of Group III does not require all the limitation of the showerhead electrode and while group II is directed to a method of assembling a showerhead electrode including an electrostatic chuck, mechanical clamping member, group II is directed to a method

Art Unit: 1763

of processing a substrate using a showerhead electrode not requiring all the limitations recited in the group II.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Peter K. Skiff on 7/24/03 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected

Art Unit: 1763

drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-3, 6, 8-10 are rejected under 35 U.S.C. 102(a) as being anticipated by Ishibashi et al (JP 2001-085398-A).

Ishibashi et al teach an apparatus (Fig. 1) for retaining an electrode plate in a plasma reaction chamber, the apparatus comprising:

chuck holding block 3 (*a backing plate having an electrode plate receiving surface*);
electrostatic chuck electrode 6 (*an electrostatic holding apparatus disposed upon said electrode plate receiving surface, the electrostatic holding apparatus having an electrode plate support surface*); and

an anode electrode 1 (*an electrode plate having a lower surface facing a substrate to be processed and an upper contact surface, the electrostatic holding apparatus being operable to compress the upper contact surface against the electrode plate receiving surface*) (paragraph 0008, abstract, and description of drawings).

Further regarding claim 2 : the apparatus of Ishibashi et al further including a clamp 4 (*mechanical clamping member ...*) (paragraph 0008).

Art Unit: 1763

Further regarding claim 3 : the apparatus of Ishibashi et al further including an electrostatic chuck electrode 6 disposed in an insulating layer 7 (*the electrostatic holding apparatus comprising a conductive layer disposed between a first and a second dielectric layer comprising compliant material*) (paragraph 008).

Further regarding claims 6, 10 : the apparatus of Ishibashi et al further including process gas channel 10 connected to with two or more process gas feed hopper 12 formed in the anode electrode 1 through the free passage way 13 (*at least one process gas port extending through the dielectric layers and the conductive layer*) (paragraph 0008).

Further regarding claim 8 : the apparatus of Ishibashi et al may further including a bipolar structure as shown in Fig. 4 (*the electrostatic holding apparatus has a bipolar or multiple design*) (paragraph 0009).

Further regarding claim 9 : the apparatus of Ishibashi et al further including a heater 18 as shown in Fig. 7 (*the electrostatic holding apparatus further comprising a resistive heating element*) (paragraph 0012).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the

Art Unit: 1763

obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al (JP 2001-085398-A) in view Roderick et al (US Patent No. 6,074,488).

Ishibashi et al teach all limitations of the claims as discussed above except for the dielectric layers comprising silicon or polyimide; the conductive layer comprising Al, Cu, Ti.

Roderick et al teach an electrostatic chuck comprising dielectric member 205 comprising material comprising silicon or polyimide (column 5, lines 8, 25-26), an electrode layer 155b comprising Al, Cu, ... (column 5, lines 62-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to select the dielectric and the electrode materials for the apparatus of Ishibashi et al as taught Roderick et al since the chuck structure in the (showerhead) electrode and the substrate support are substantially the same.

Claims 7, 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al (JP 2001-085398-A).

Ishibashi et al teach all limitations of the claims as discussed above except for explicitly disclosing the electrostatic holding apparatus having a thickness of 0.005-0.015 inches; the electrostatic holding apparatus being in contact with at least 80% of the total surface of the upper contact surface.

Regarding claim 7: it would have been obvious to one of ordinary skill in the art at the time of the invention to select the thickness of the electrode layer 6 and the dielectric layer 7 sufficiently thin in order to allow good thermal contact between the electrode 1 and the thermally

Art Unit: 1763

controlled chuck holding block 3. The recited range of the thickness is considered to have been obvious through routine optimization of parameters of thickness of the chuck 6, 7 versus acceptable thermal energy transfer between the electrode 1 and the chuck holding block 3.

Regarding claim 12: As shown in Fig. 1 of the apparatus of Ishibashi et al the entire surface of the dielectric layer 7 of the electrostatic chuck electrode 6 is in contact with the upper surface of the chuck holding block 3 and the peripheral portion of the block 3 which is not in contact with the chuck made a small portion of the entire surface of the block 3.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to maximize the contact surface between the chuck and the chuck holding block in order to more uniformly attract the electrode plate 1 to the chuck holding block 3.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al (JP 2001-085398-A) in view of Denger et al (US Patent No. 5,074,456).

Ishibashi et al teach all limitations of the claims as discussed above except for the electrode plate comprising a single crystal silicon, graphite or silicon carbide.

Denger et al teach a showerhead electrode assembly (Fig. 4) including an electrode plate 12 comprising substantially pure material which are compatible with a particular reaction being performed in the reactor such a single crystal silicon, graphite or silicon carbide (table 1, column 3, line 40 through column 4, line 20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to select the electrode plate as taught by Denger et al from pure material and compatible with the process to be performed such as a single crystal silicon.


Art Unit: 1763

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050.

The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.


Parviz Hassanzadeh
Primary Examiner
Art Unit 1763

July 25, 2003